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DEC. 1961

OOAMA

AIRMUNITIONS TEST REPORT

SERVICEABILITY TEST OF CONTINUITY
TEST STAND USED WITH THE 2.75 INCH
FOLDING FIN AIR ROCKET

62-1-5
XEROX



SERVICEABILITY TEST OF CONTINUITY TEST STAND
USED WITH THE 2.75 INCH FOLDING FIN AIR ROCKET

by

John H. Schnabel, 2d Lt, USAF

PUBLICATION REVIEW

This report has been reviewed and is approved



ALEX D. PERESICH
Chief, Engineering and
Test Division
2705th Airmunitions Wing

DECEMBER 1961

2705TH AIRMUNITIONS WING
OGDEN AIR MATERIEL AREA
AIR FORCE LOGISTICS COMMAND
UNITED STATES AIR FORCE
Hill Air Force Base, Utah

NOTICES

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The conclusions and recommendations made in this report are not to be considered directive in nature. This type information becomes official only when published in Technical Orders and/or other applicable Air Force publications.

ADMINISTRATIVE DATA

PURPOSE OF TEST:

The purposes of this test were:

1. To determine if a typical holding stand would retain rockets, with inert or high explosive heads, should a motor be accidentally ignited during the continuity check.
2. To determine the effect on the warhead if the motor ignites while being retained in the stand.
3. To determine the capability of the stand in retaining adjacent rockets in the event a warhead is detonated.

DRAWINGS AND TECHNICAL ORDERS:

OOAMA Dwg 6100YD20
Technical Order 11A11-2-2

SECURITY CLASSIFICATION:

Unclassified

DATE TEST COMPLETED:

13 September 1961

TEST CONDUCTED BY:

OOAMA (OOYET Test Branch, Engineering and Test Division, (OOYE))

Test Director: Hoyt O. Brown, Major, USAF

Project Officer: John H. Schnabel, 2d Lt, USAF

DISPOSAL OF SPECIMENS:

All metal parts generated were inspected and certified inert and turned over to the Redistribution and Marketing Division in accordance with Technical Order 11C3-1-3.

ABSTRACT

The 2.75 Inch Rocket Igniter is continuity tested by placing the rocket in a suitable holding fixture and testing with a meter. The purposes of this test were:

1. To determine if a typical holding stand would retain rockets, with inert or high explosive heads, should a motor be accidentally ignited during the continuity check.
2. To determine the effect on the warhead if the motor ignites while being retained in the stand.
3. To determine the capability of the stand in retaining adjacent rockets in the event a warhead is detonated.

The fixture tested consisted of a steel base plate with three holes, 6.75 inches from center to center, to accommodate the rockets. The fuzes of the rocket heads extended through the plate with the rocket resting on the center of the head.

Twenty-two motors, with 9 inert and 13 high explosive heads, were functioned. Three rockets with H.E. heads were placed in the stand, and the center head detonated.

The stand was satisfactory in that:

1. The rocket(s) did not escape from the stand.
2. The adjacent rockets were not damaged or ignited.
3. The H.E. head did not detonate when the motor was functioned.
4. When the H.E. head of the center rocket was detonated, the motor was completely destroyed. The adjacent heads were thrown approximately 300 feet. The heads were split open, but did not burn or detonate. The motors burned in place.

The 2.75 inch rocket continuity test stand of the design tested will satisfactorily retain rocket motors, assembled with inert or H.E. heads, should a motor(s) be accidentally ignited.

TABLE OF CONTENTS

	PAGE
Notices	ii
Administrative Data	iii
Abstract	iv
Table of Contents	v
Introduction	1
Description	1
Equipment	2
Function Tests	2
Figure 1	3
Figure 2	5
Figure 3	5
Figure 4	6
Detonation Test	7
Test Results	7
Conclusions	8
Recommendations	8
Figure 5	9
Figure 6	10
Figure 7	10
Distribution List	11

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INTRODUCTION

In accordance with Technical Order 11A11-2-2, the procedure for performing a continuity check on 2.75 inch rocket motors is to place one motor, without warhead, in a metal supporting stand and then conduct the check. This procedure is satisfactory but quite slow when assembling the warhead to the rocket motor for the first time. After the warheads are assembled to the motors and loaded on the aircraft, they are either fired in training or returned for possible down loading. Any time the rockets are removed from the aircraft, or removed from the ready storage site, another continuity check is required prior to up-loading. Further, the procedures in Technical Order 11A11-2-2 requires that the motors be tested without warheads assembled; therefore, the rockets would have to be disassembled prior to the continuity check. This test was conducted to determine if one or more rockets in the complete round configuration could be safely continuity checked in a typical stand. Further, what would be the results if a motor was accidentally ignited or if a warhead detonated?

The tests were accomplished in accordance with Test Directive S-1-512-Y. The directive was prepared by the Explosives Evaluation Branch (OOYEE), Engineering and Test Division (OOYE), 2705th Airmunitions Wing (OOY), OGAAMA.

The tests were conducted by the Test Branch (OOYET), Engineering and Test Branch (OOYET), Engineering and Test Division (OOYE), 2705th Airmunitions Wing (OOY), OGAAMA.

DESCRIPTION

The 2.75 inch rocket is an air-to-air rocket designed to provide armament for high speed fighter and intercept aircraft. The rocket can also be used as an air to ground weapon. The 2.75 inch rocket (with head) is 48 inches in length and weighs 18.1 pounds.

EQUIPMENT

2.75 Inch Rocket Continuity Test Stand (Figure 1).

Bridge Type ohmeter.

Torque wrench and strap wrench.

Electric ignition equipment.

G-6 Press camera.

FUNCTION TESTS

TEST NUMBER 1.

A single rocket with an inert head, was placed in the center position of the stand (Figure 2). After attaching the connecting wires and continuity checking, the motor was functioned.

TESTS NUMBERS 2, 3, AND 4.

Three rockets, with inert heads, were placed in the stand. After attaching the wires to the Number 2 rocket and continuity checking, the motor was functioned (Figure 3).

TESTS NUMBERS 5 AND 6.

Three rockets, with inert heads, were placed in the stand (Figure 3). After attaching the connecting wires to the Number 1 rocket and continuity checking, the motor was functioned. Rocket Number 3 was also functioned in this same manner.

TEST NUMBER 7.

Three rockets with inert heads, were placed in the stand. After attaching the wires and continuity checking each rocket, the three motors were functioned simultaneously (Figure 4).

TEST NUMBER 8.

A single rocket, with a high explosive head, was placed in the Number 2 position as shown in Figure 2. After attaching the connecting wires and continuity checking, the motor was functioned.



3



TEST DIRECTIVE ~ S-1-512-Y

MINOR SYSTEMS (PNEUMATIC, HYDRAULIC, ETC.) DRAWING AND/OR SECTION NO. <u>5-510826</u>		DRAWING NO. <u>5-510826</u> SHEET NO. <u>1 OF 1</u>	U. S. AIR FORCE AND OAHAMA HILL AFB, UTAH LOCAL DRAWING
TITLE <u>NOTED</u>	PROJECT NO. <u>68</u> SPECIALS <u>2</u> APPROVALS <u>2</u> COMMENTS (SHEET)	STAND CONTINUITY TEST 2.75" ROCKET	6100YD 20 SHEET 1 OF 1
TREATMENT <u>NOTED</u>	DRAWING 2111, 11/21/54 2111, 11/21/54	SCALE <u>NOTED</u> OR APPROX. - 65 LBS	

2. REMOVE ALL BURRS & SHARP EDGES.
1. WELDED CONSTRUCTION.
NOTE:

by Test Stand.



FIGURE 3. Three Rocket Test Set-Up Using Inert or H.E. Warheads. (One motor at a time was functioned.)

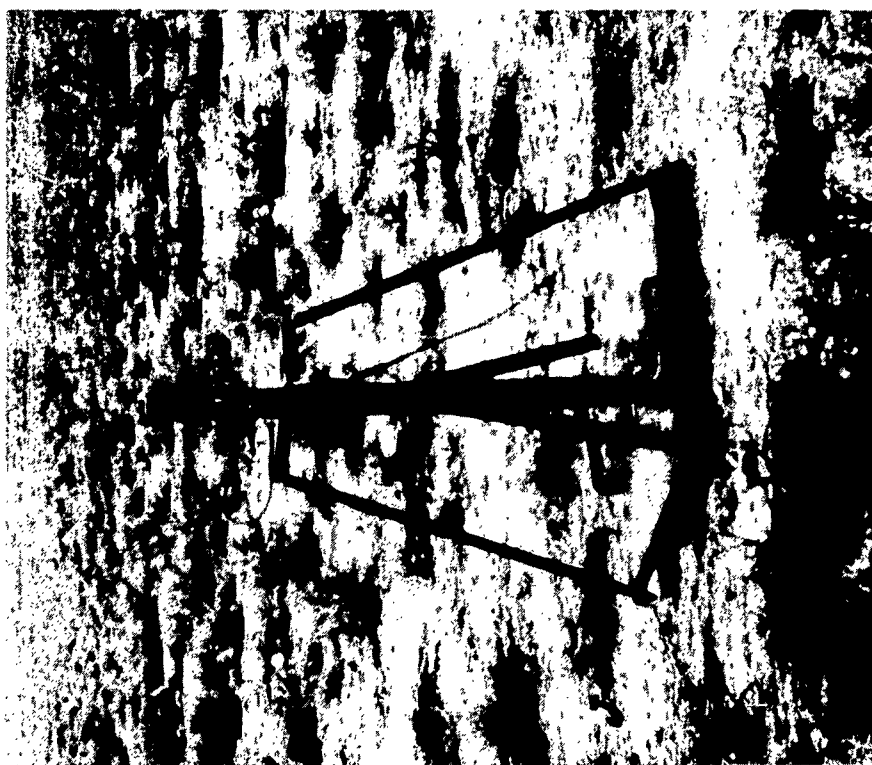


FIGURE 2. Single Rocket Test Set-Up Using Inert or H.E. Warheads.

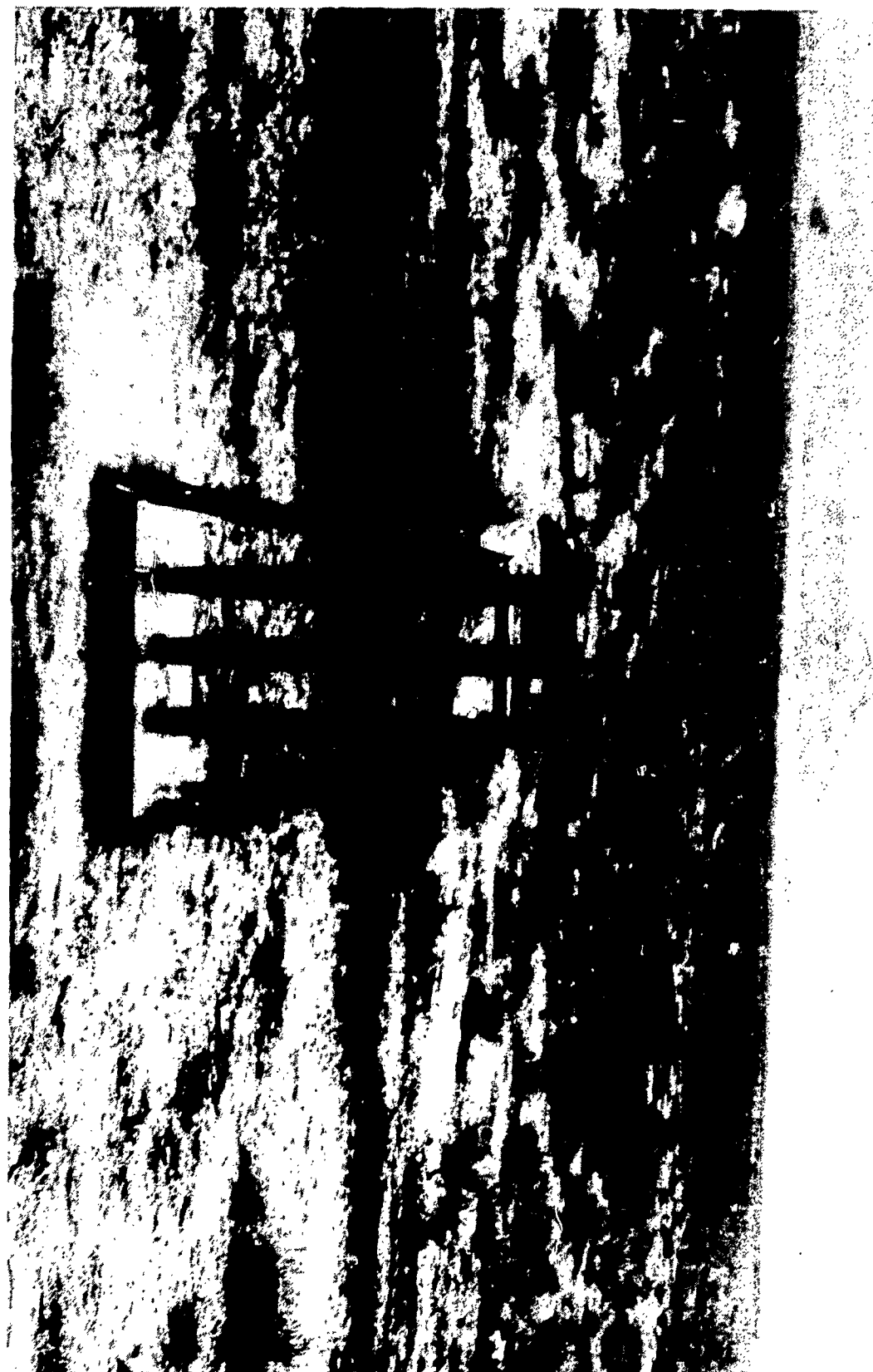


FIGURE 4. Three Rocket Test Set-Up Using Inert or H.E. Warheads.
(All motors fired simultaneously.)

TESTS NUMBERS 9, 10 AND 11.

Three rockets, with high explosive heads, were placed in the stand (Figure 3). After attaching the connecting wires to the Number 2 rocket and continuity checking, the motor was functioned. Rocket Number 1 for Test Number 10, and Rocket Number 3 for Test Number 11 were also functioned in this same manner.

TESTS NUMBERS 12, 13 AND 14.

Three rockets, with high explosive heads were placed in the stand. After attaching the wires and continuity checking each rocket, the three motors were functioned simultaneously (Figure 4).

DETONATION TEST

TEST NUMBER 15.

Three rockets, with high explosive heads, were placed in the stand. The fuze from center rocket was removed and Composition "C" was inserted in the fuze cavity. A blasting cap was inserted in the Composition "C" and the rocket head detonated.

TEST RESULTS

FUNCTION TEST RESULTS.

In the function tests conducted, the stand was satisfactory in that:

1. The rocket(s) did not escape from the stand.
2. The adjacent rockets were not damaged or ignited.
3. The high explosive heads did not detonate when the motor(s) was functioned.

DETONATION TEST RESULTS.

The warheads from the two adjacent rockets were thrown approximately 300 feet, and were broken open, but did not detonate or burn.

The adjacent rocket motors burned in place. The motor assembled to the warhead, which was detonated, was completely destroyed. Figure 5 shows the results of the detonation. Figures 6 and 7 show the condition of the two H.E. warheads.

CONCLUSIONS

Nine rocket motors with inert heads, and thirteen rocket motors with H.E. heads, were continuity checked and purposely functioned in a test stand. From these tests it is concluded that:

1. 2.75 Inch Rocket Motors, assembled with inert or high explosive warheads, can be safely continuity checked as a complete round.
2. A rocket motor(s) accidentally ignited during a continuity check will not escape from a test stand equivalent to the design shown in Figure 1, nor will the adjacent motor(s) be affected.
3. A high explosive warhead detonated in a continuity test stand will not detonate adjacent warhead(s) provided the rockets are separated by at least four inches. However, the adjacent warheads may be projected a distance of 300 feet from the test site, and the motors probably will burn in place.

RECOMMENDATIONS

As a result of the tests conducted, it is recommended that:

1. Using activities review their continuity check stands to insure that the stand is adequately constructed and will retain a 2.75 inch rocket motor should the motor become ignited. The OGAMA test stand, shown in Figure 1, is considered adequate with respect to safety and construction.
2. Technical Order 11A11-2-2 be revised to allow using activities to continuity test 2.75 inch rocket motors in the complete round configuration.

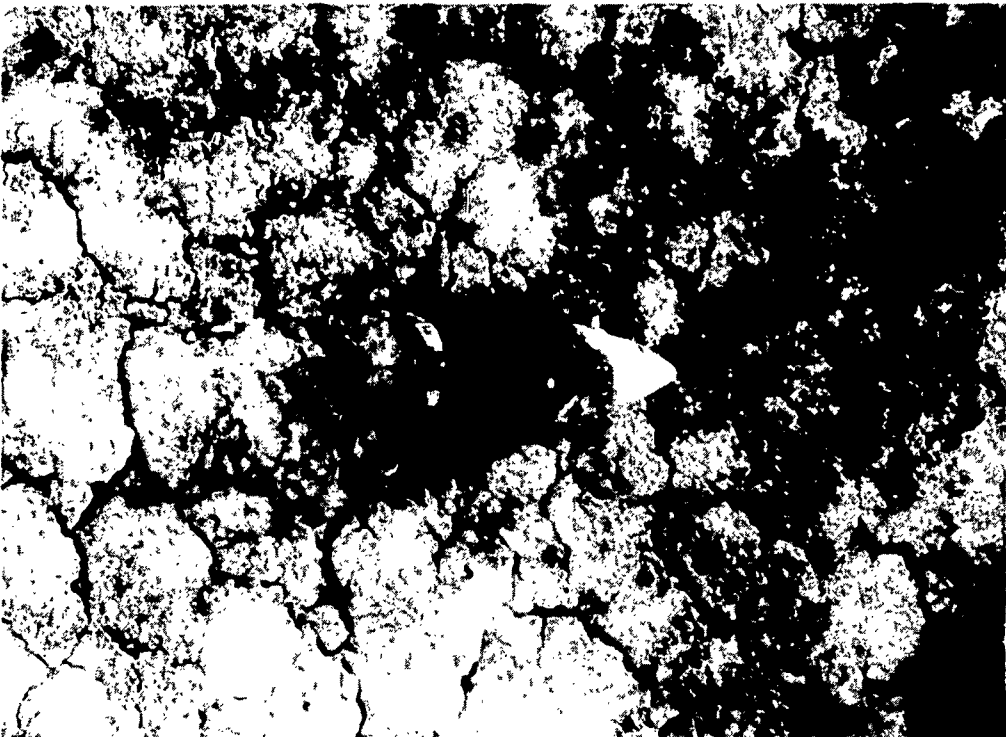


FIGURE 5. Continuity Test Stand After Detonation Test.

FIGURE 6. H.E. Warhead Located 300 Feet
from Test Site.



FIGURE 7. H.E. Warhead Located 300 Feet
from Test Site.



DISTRIBUTION LIST

1 Dep IG of Safety, Hq USAF (AFIGS-B) Norton AFB, Calif
 1 Hq USAF (AFMSS-AE) Wash 25, DC
 1 AFLC (MCMTC) Wright-Patterson AFB, Ohio
 1 Det 4, ASD (ACR) Eglin AFB, Fla
 2 AU Lib, Maxwell AFB, Ala
 1 USAFA, Colorado Springs, Colo
 10 ASTIA, Arlington Hall Station, Arlington 12, Va
 1 ASES, DOD, Wash 25, DC
 1 Bureau of Naval Weapons (Mtal Div) Dept of the Navy, Wash 25 DC
 1 Ord Fld Safety Ofc, Box 600, Jeffersonville, Ind
 1 Ofc of the Ch of Ord, Dept of the Army (ORDGU-SA) Wash 25, DC
 1 Ord Ammo Comd (ORDLY-Q) Joliet, Ill
 1 Picatinny Arsenal (Tech Lib) Dover, NJ
 1 Hq AFSC, Andrews AFB, Md
 1 CG US Naval Torpedo Stn (QEL Tech Lib), Keyport, Wash
 10 OAMA, Hill AFB, Utah (1-00Y, 1-00YIT, 1-00YS, 1-00YET, 5-00YEE,
 1-00YID)
 1 TAG (Dir of Requirements) Langley AFB, Va
 4 ADC (ADMME-DE) Ent AFB, Colo
 2 ATC, Randolph AFB, Tex
 1 ConAC, Robins AFB, Ga
 2 USAFE, APO 633, New York, NY
 2 PACAF, APO 953, San Francisco, Calif
 2 AMFEA, APO 10, New York, NY
 2 AAG, APO 942, Seattle, Wash
 2 NGB (NG-AFMS) Wash 25, DC
 1 QeLAB, Naval Ammo & Net Depot, Seal Beach, Calif
 1 QeLAB, Naval Ammo Depot, Concord, Calif
 1 R-1, Naval Propellant Plant, Indian Head, Md
 1 Naval Ord Test Station, China Lake, Calif
 1 ASC (ASQW), Wright-Patterson AFB, Ohio
 1 AFFTC (FTRDS), Edwards AFB, Calif
 1 Allegany Ballistic Lab (Re6c), Cumberland, Md
 1 Hq AFSC, (SCMMS-3) Attn Lt Col W. H. Hopkinson, Andrews AFB, Md

<p>AD</p> <p>2705th Almunitions Wing (COMMA), Hill Air Force Base, Utah SERVICEABILITY TEST OF CONTINUITY TEST STAND USED WITH THE 2.75 INCH FOLD- ING FIN AIR ROCKET, by John H. Schnabel, 2d Lt, USAF, December 1961, 11p incl. figures. (COY-TR-61-51)</p> <p>Unclassified Report</p> <p>The 2.75 Inch Rocket Igniter is continuity tested by placing the rocket in a suitable holding fixture and testing with a meter. The purposes of this test were: 1. To determine if a typical holding stand would retain rockets, with inert or high explosive heads, should a motor be accidentally ignited during the continuity check. 2. To determine the effect on the warhead if the motor ignites while being retained in the stand. 3. To determine the capability of the stand in retaining adjacent rockets in the event a warhead is detonated. The fixture tested consisted of a steel base plate with three holes, 6.75 inches from center to center, to accommodate the rockets. The fuses of the rocket heads extended through the plate with the rocket resting on the center of the head. Twenty-two rockets, with 9 inert and 13 high explosive heads, were functioned. Three rockets, with H.E. heads were placed in the stand, and the center head detonated. The stand was satisfactory in that: 1. The rocket(s) did not escape from the stand. 2. The adjacent rockets were not damaged or ignited. 3. The H.E. head of the center rocket was detonated, the motor was completely destroyed. The adjacent heads were thrown approximately 300 feet. The heads were split open, but did not burn or detonate. The motors burned in place. The 2.75 inch rocket continuity test stand of the design tested will satisfactorily retain rocket motors, assembled with inert or H.E. heads, should a motor(s) be accidentally ignited.</p>	<p>UNCLASSIFIED</p> <p>I. John H. Schnabel, 2d Lt, USAF</p>	<p>AD</p> <p>2705th Almunitions Wing (COMMA), Hill Air Force Base, Utah SERVICEABILITY TEST OF CONTINUITY TEST STAND USED WITH THE 2.75 INCH FOLD- ING FIN AIR ROCKET, by John H. Schnabel, 2d Lt, USAF, December 1961, 11p incl. figures. (COY-TR-61-51)</p> <p>Unclassified Report</p> <p>The 2.75 Inch Rocket Igniter is continuity tested by placing the rocket in a suitable holding fixture and testing with a meter. The purposes of this test were: 1. To determine if a typical holding stand would retain rockets, with inert or high explosive heads, should a motor be accidentally ignited during the continuity check. 2. To determine the effect on the warhead if the motor ignites while being retained in the stand. 3. To determine the capability of the stand in retaining adjacent rockets in the event a warhead is detonated. The fixture tested consisted of a steel base plate with three holes, 6.75 inches from center to center, to accommodate the rockets. The fuses of the rocket heads extended through the plate with the rocket resting on the center of the head. Twenty-two rockets, with 9 inert and 13 high explosive heads, were functioned. Three rockets, with H.E. heads were placed in the stand, and the center head detonated. The stand was satisfactory in that: 1. The rocket(s) did not escape from the stand. 2. The adjacent rockets were not damaged or ignited. 3. The H.E. head of the center rocket was detonated, the motor was completely destroyed. The adjacent heads were thrown approximately 300 feet. The heads were split open, but did not burn or detonate. The motors burned in place. The 2.75 inch rocket continuity test stand of the design tested will satisfactorily retain rocket motors, assembled with inert or H.E. heads, should a motor(s) be accidentally ignited.</p>	<p>UNCLASSIFIED</p> <p>I. John H. Schnabel, 2d Lt, USAF</p>
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